

Conservation and Restoration of Forest Trees Impacted by Non-Native Pathogens: the Role of Genetics and Tree Improvement¹

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North American native tree species in forest ecosystems, as well as managed forests and urban plantings, are being severely impacted by pathogens and insects. The impacts of these pathogens and insects often increase over time, and they are particularly acute for those species affected by non-native pathogens and insects. For restoration of affected tree species or for their continued presence in managed forests and urban plantings, genetic resistance will be key. Often, however, little or nothing is known about genetic resistance to these invaders. The U.S. Department of Agriculture Forest Service is a world leader in the applied development of resistance to diseases of forest trees. One of these programs, based at Dorena Genetic Resource Center (DGRC), Cottage Grove, Oregon, has been active for 50 years. It provides an example of the role of genetics and tree improvement in the conservation of affected tree species. The DGRC has active programs to develop genetic resistance to white pine blister rust (caused by *Cronartium ribicola*) in several white pine species, and Port-Orford-cedar root disease (caused by *Phytophthora lateralis*). One of the white pine species, whitebark pine (*Pinus albicaulis*), has been proposed for listing under the Endangered Species Act (ESA) in the United States and is now listed as endangered by COSEWIC, the Committee on the Status of Endangered Wildlife in Canada. The development of genetic resistance from seedling screening trials at DGRC is well underway, and seed collections from resistant parents are now being used for restoration efforts. Special regional or national units such as DGRC provide the capability to organize and respond to these invasive agents. The work at DGRC is integrated with basic research performed elsewhere, and coupled with restoration programs of land managers who work with these species. Collaboration between programs such as DGRC and land managers, other agencies, and non-government organizations provides the best chance of retaining species threatened by rapid biotic and abiotic environmental change.

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